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## AN ANALYSIS OF CULTURE CHANGE IN THE ACKMEN-LOWRY AREA

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In 1948 a seriation was made of the principal pottery types in Mogollon sites in western New Mexico and presented in the form of a wedge-bar-graph (Martin, Rinaldo, and Antevs, 1949, pp. 190 ff., Fig. 71). This provided such a detailed and excellent picture of the relationships of these pottery types that it was decided to make a similar seriation of the pottery types in the Ackmen-Lowry area. It was evident from a brief analysis of differences in pottery type percentages between the various houses and sites of the Ackmen-Lowry area that we were dealing with differences that covered intervals of time within the several phases of the Mesa Verde Branch.

We had known from tree-ring dates that all the houses at these Ackmen-Lowry area sites were not constructed at one time. Furthermore, at three sites this conclusion had been confirmed by differences in stratigraphy and architectural typology. However, it did not occur to us earlier that a finer division of the phases—house-unit by house-unit—would be useful. This was proved to us by our experience with the Mogollon sites of the Mimbres Branch.

From stratigraphy, dendrochronology, and cross-dating with trade pottery, we already knew the rise and fall of some Mesa Verde Branch pottery types from one phase to another (Brew, 1946; Martin, 1936, 1938, 1939; Morris, 1939; Reed, 1944). However, we did not know whether there was one or more than one crest of popularity of any one type, or whether a particular type reached this crest early or late in the phase; for example, it was determined that Abajo Red-on-Orange was used during the Abajo and Mancos phases, being more popular during the Abajo phase, but it was not clear whether its peak in popularity occurred early or late or whether there was one or more than one climax.

The method followed in producing the seriation and the form of graphical presentation was the same as that used for the seriation

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of the Mogollon pottery types (Martin, Rinaldo, and Antevs, 1949, pp. 190 ff., Fig. 71). This in turn was a variation on a graphic method used by James A. Ford and others in their studies of archaeology of the southeastern United States (Ford and Willey, 1940; Ford and Quimby, 1945). Such a method is not foreign to the Southwest as it is essentially the classical type of seriation that Spier used in his *Outline for Chronology of the Zuni Ruins*. However, in our graph it is represented in a column-wedge type graph similar to that used by Haury and Sayles in illustrating relative frequencies of artifact types through time at Snaketown (Gladwin, Haury, Sayles, and Gladwin, 1937). Beals, Brainerd, and Smith (1945) worked out something similar for pottery types in the Kayenta area. The variation that we have given this method is to use house structures or stratigraphic levels as our "time"-axis units, thus making a finer division of sites or phases. We believe this gives a more precise picture of the changes through time than the less complex curve that represents the differences between phases only.

In making this graph we hoped to achieve the following results: (1) place the sites in approximate chronological order within the phases; (2) place the houses in approximate chronological order within the sites; (3) determine the approximate point in time when any particular pottery type reached the peak of its greatest use; (4) corroborate our conclusions concerning the development of artifact and architectural types; and (5) check ranking by means of available tree-ring dates.

In the formation of this seriation and its graphic representation we had the following facts to use as a basis:

(1) The use of Lino Gray waned during the later periods in the Mesa Verde sequence (Mancos and McElmo phases), and it was rapidly replaced by Kana-a Gray and other corrugated types.

(2) The sequence of phases in the Mesa Verde Branch included in our chart are La Plata-Abajo (hereafter termed Abajo in this paper), Mancos, McElmo. The sequence of these phases had been established by tree-ring dates and by stratigraphy.

(3) Abajo Red-on-Orange may have appeared during the phase preceding the Abajo phase and reached its peak during that phase.

(4) Mancos Black-on-White came into use during the Mancos phase.

(5) Somewhat later during the same phase McElmo Black-on-White came into use. This pottery type reached its peak of use during the McElmo phase.

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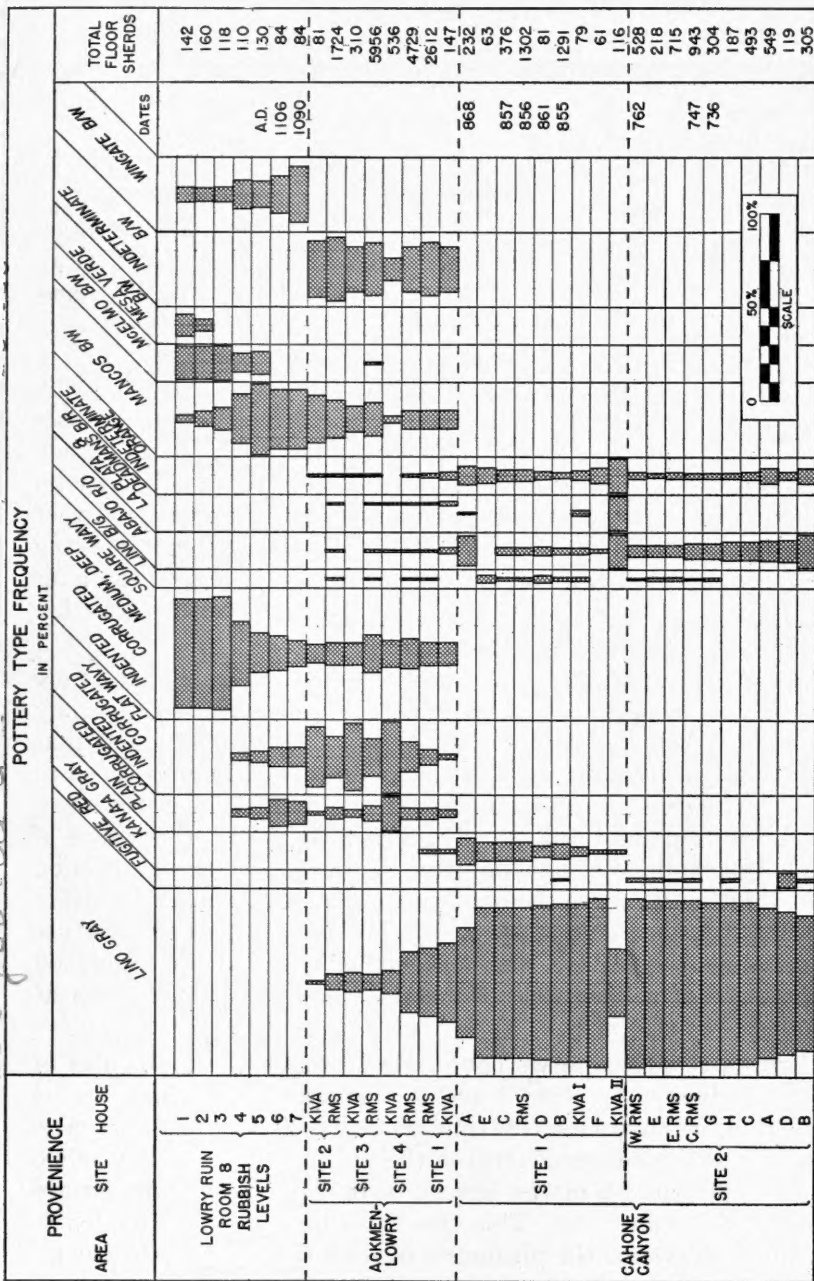


FIG. 21. Chart showing pottery seriation. C. Rms. = central section of rooms; E. Rms. = eastern section of rooms; W. Rms. = western section of rooms. The date of A.D. 1090 is for Room 21, Lowry ruin, which had pottery percentages roughly equivalent to those for level 7, Room 8.



(6) McElmo Black-on-White was in turn followed by Mesa Verde Black-on-White.

In order to have as complete a sequence as possible we utilized the data from seven sites: Sites 1 and 2, Cahone Canyon (Martin, 1939); Sites 1-4, Ackmen-Lowry area (Martin, 1938); and the Lowry ruin (Martin, 1936).

The earliest house in our series was taken to be that one which yielded the most Abajo Red-on-Orange and the least Lino Gray of all the houses that yielded only Lino Gray, Fugitive Red, and Abajo Red-on-Orange. The house structures and levels were then placed in sequence above it according to the trends outlined in previous reports (see Martin, 1936, Fig. 43; 1938, Fig. 57; 1939, Fig. 144). Therefore, what is presented here is a seriation of houses or structural units and levels based on pottery percentages. Each structure (or level) was considered as a separate unit, primarily on the basis of the percentages of pottery that came from it. Other knowledge relating to chronological sequence, such as tree-ring dates, stratigraphy, artifact and architectural typology, was later used to check the results, and was disregarded until the seriation was complete.

After the graph had been completed, the tree-ring dates were inserted and the sequence was checked further against stratigraphy and artifact and architectural typology. Then it was found that the rooms and kiva of Site 3 (Ackmen-Lowry) had been placed in a position in the sequence different from that deduced for them previously (Martin, 1938, pp. 278, 295, 299) from the presence of McElmo Black-on-White at that site. However, the present position of Site 3 in the sequence (before Site 2, Ackmen-Lowry area; earlier than Site 2, rather than later) is corroborated by kiva architecture (all masonry, walled kiva with masonry pilasters at Site 2) and by the presence of a later type of metate—that with trough open at both ends—in this kiva.

Fortunately, because we have tree-ring dates for the houses of the two earliest sites (Sites 1 and 2, Cahone Canyon) and for the Lowry ruin, we have a relative time scale as well as a house sequence. According to this sequence most of the pit-houses at Site 2, Cahone Canyon (the earliest in the series), were built before the surface houses at the same site. This checks with the pottery sequence, which also shows for the pit-houses of each section of the village a specific sequence that corresponds to that of the various sections of surface houses. Thus the pit-houses of the central section of the



village are first in the sequence and "earliest," followed by those in the eastern section, and finally, as "latest," by those in the western section. The three sections of surface houses follow the same sequence, the central section preceding the eastern and western sections in that order. It is interesting to note that on the three later Ackmen-Lowry area sites (Sites 4, 3, and 2), this order of pit-houses preceding surface houses is reversed. Here the surface structures preceded the proto-kivas. These "kivas" contained smaller quantities of Lino Gray, Lino Black-on-Gray and Abajo Red-on-Orange—all the earlier pottery types. They also contained more of the later indented corrugated types.

It was impossible to obtain a reliable sequence of the rooms and kivas at Lowry ruin by pottery seriation. As stated in the report on that site (Martin, 1936, p. 201), "... the periods of building and occupation were too short to allow consistent or undisturbed deposits of sherds at floor levels that would give evidence of this [room sequence]." Other reasons for the unreliability of these data for the purpose are (1) the small size of the floor sherd sample for statistical use; (2) the re-utilization of the dwelling rooms as storage rooms; (3) the overlapping of construction and occupation periods; for example, a room built in the second addition might continue to be lived in after rooms built in the fourth addition were abandoned, thus making an architectural check on the pottery sequence unreliable.

On the other hand, the sequence of levels in the rubbish of Room 8, Lowry ruin, dovetailed nicely into the seriation from the earlier sites, beginning with level 7, the level just below the floor level of this room.

By limiting the units of the seriation to those rooms in Lowry ruin that had a fair statistical sample of sherds at floor level, and leaning heavily on the architectural sequence, a fairly probable sequence was constructed. A seriation was also made of pottery type percentages from a surface survey of 180 sites in the area (Martin, 1938, p. 282). The trends delineated in these sequences correspond roughly to those from the stratified rooms but lack the degree of probability and add nothing in detail to the graphically represented trend (see Fig. 21). They are therefore omitted from this report.

Besides adding to our knowledge of the sequences of sites and house structures, the seriation confirmed our concept of the sequence of house types. The types of above-ground structures differed very

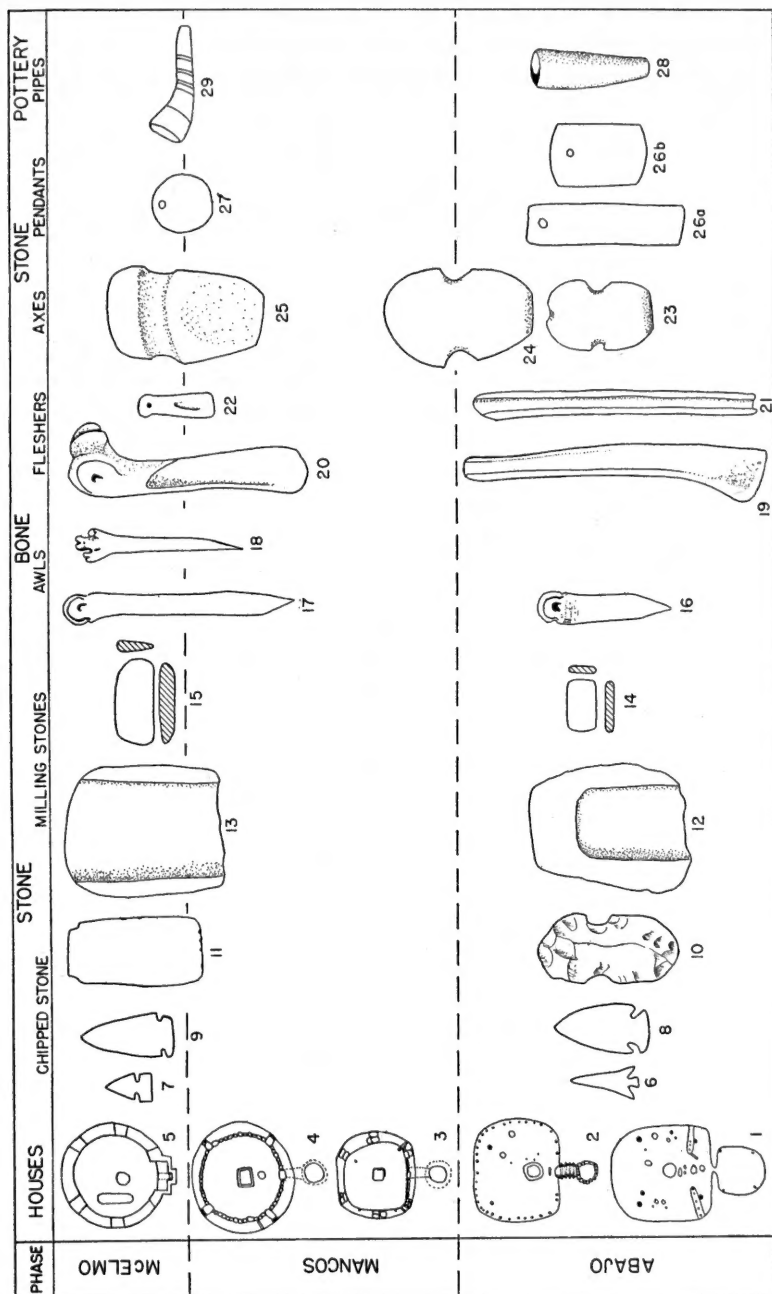


FIG. 22. Chart showing culture traits.

EXPLANATION OF FIGURE 22: CHART SHOWING CULTURE TRAITS

1. Pit-house B, plan, Site 2, Cahone Canyon (Martin, P. S., 1939, Map 22, p. 370).
2. Pit-house A, plan, Site 1, Cahone Canyon (Martin, P. S., 1939, Map 14, p. 340).
3. Kiva, plan, Site 4, Ackmen-Lowry (Martin, P. S., 1938, Map 9, p. 252).
4. Kiva, plan, Site 2, Ackmen-Lowry (Martin, P. S., 1938, Map 7, p. 244).
5. Kiva C, plan, Lowry ruin (Martin, P. S., 1936, Fig. 7, p. 45).
6. Diagonal-notched projectile point, Site 2, Cahone Canyon (Martin, P. S., 1939, Fig. 117, p. 415).
7. Side-notched projectile point, Lowry ruin (Martin, P. S., 1936, Fig. 8, p. 55).
8. Diagonal-notched knife, Site 2, Cahone Canyon (Martin, P. S., 1939, Fig. 117, p. 415).
9. Side-notched knife, Lowry ruin (Martin, P. S., 1936, Fig. 9, p. 57).
10. Chipped, notched hoe, Site 2, Cahone Canyon (Martin, P. S., 1939, Fig. 116, p. 413).
11. Thin plate-like hoe, Lowry ruin (Martin, P. S., 1936, Fig. 13, p. 64).
12. Scoop-type metate, Site 2, Cahone Canyon (Martin, P. S., 1939, Fig. 109, p. 399).
13. Metate, trough open both ends, Lowry ruin (Martin, P. S., 1936, Pl. lxxv).
14. Tabular mano, Site 2, Cahone Canyon (Martin, P. S., 1939, Figs. 105, 106, pp. 392, 393).
15. Mano, wedge-shaped in cross section, Lowry ruin (Martin, P. S., 1936, Pl. lxxv).
16. Stubby awl, Site 2, Cahone Canyon (Martin, P. S., 1939, Fig. 124, p. 429).
17. Medium long awl, Lowry ruin (Martin, P. S., 1936, Fig. 16, p. 67).
18. Turkey bone awl, Lowry ruin (Martin, P. S., 1936, Fig. 21, p. 74).
19. Spoon-spatula flesher, Site 2, Cahone Canyon (Martin, P. S., 1939, Fig. 122, p. 425).
20. Humerus, condyle intact, flesher, Lowry ruin (Martin, P. S., 1936, Fig. 23, p. 76).
21. Scoop-type flesher, Site 2, Cahone Canyon (Martin, P. S., 1939, Fig. 122, p. 425).
22. Phalange-type flesher, Lowry ruin (Martin, P. S., 1936, Fig. 23, p. 76).
23. Three-notched ax, Site 2, Cahone Canyon (Martin, P. S., 1939, Fig. 114, p. 409).
24. Side-notched ax, Site 4, Ackmen-Lowry (Martin, P. S., 1938, Pl. cxxxviii).
25. Full-grooved ax, Lowry ruin (Martin, P. S., 1936, Fig. 11, p. 61).
- 26a, b. Long rectangular pendant and rectangular pendant, Site 2, Cahone Canyon (Martin, P. S., 1939, Fig. 119, p. 419).
27. Round pendant, Lowry ruin (Martin, P. S., 1936, Fig. 14, p. 65).
28. Conical pipe, Site 1, Cahone Canyon (Martin, P. S., 1939, Fig. 121, p. 423).
29. Elbow pipe, Lowry ruin (Martin, P. S., 1936, Fig. 15, p. 66).

## COMPARATIVE FREQUENCY OF ARTIFACT TYPES IN ACKMEN-LOWRY AREA

	<i>Cahone</i>		<i>Williford</i>				<i>Lowry</i>
	2	1	1	4	3	2	1
Arrow points							
Diagonal-notched.....	10	13	1	.	.	.	3
Side-notched.....	2	..	.	.	.	.	6
Knives							
Diagonal-notched.....	1	1	.	.	.	.	..
Side-notched.....	..	..	.	.	.	.	1
Leaf-shaped.....	4	2	1	.	.	.	..
Hoes							
Chipped, notched.....	1	1	2	1	.	.	..
Thin, plate-like.....	..	..	.	.	.	.	1
Metates							
Scoop type.....	12	33	1	1	1	2	..
Trough open both ends.....	..	..	.	.	.	1	11
Manos							
Tabular.....	40	114	2	7	7	4	..
Wedge-shaped in cross section.....	15	35	1	1	7	1	7
Awls							
Short and massive (0-10 cm.).....	19	7	2	2	4	2	9
Long and dagger-like (17-21 cm.)...	9	2	.	1	.	.	3
Medium long (10-17 cm.).....	21	4	1	2	3	5	19
Fleshers							
Spoon-spatula.....	4	1	.	.	.	.	..
Scoop-type.....	1	..	.	.	.	.	..
Humerus, condyle broken off.....	1	..	1	.	.	2	1
Humerus, condyle intact.....	..	..	.	.	.	.	4
Phalange.....	..	..	.	.	.	.	1
Pendants							
Long rectangular.....	2	..	.	.	.	.	..
Oval to round.....	3	1	.	.	.	.	3
Pipes							
Conical.....	..	4	.	.	.	.	..
Elbow.....	..	..	.	.	.	.	3
Axes							
Three notches (poll and sides).....	3	1	.	.	.	.	..
Side-notched.....	..	..	.	3	.	1	..
Full-grooved.....	..	..	.	1	.	.	2
Three-quarter-grooved.....	..	..	.	1	1	.	..

little within the individual sites and therefore nothing can be added to what has already been reported concerning the development of these surface structures. However, the pit-houses did differ sufficiently within the several sites to confirm the sequence of types set up hitherto on the basis of stratigraphy and typology. More specifically, the reoccupied houses at Site 1, Cahone Canyon, had indicated that pit-houses with large southern antechambers were earlier than those with small southern antechambers, or those with

ventilator shafts (Martin, 1939, p. 342). Also, the stratigraphy at Alkali Ridge, Site 13 (Brew, 1946, p. 159), has shown that the earlier pit-houses were those in which the southern antechambers were larger in proportion to the size of the main room of the house. In Brew's terminology, the Type I shallow pit-house with large southern antechamber was earlier than the Type II small deep pit-house with smaller southern antechamber connected by a narrow passageway to the main room (Brew, 1946, pp. 158-159). In the Ackmen-Lowry pottery seriation it was found that Pit-house B, Site 2, Cahone Canyon, was the earliest, and on that site this is the house most like Brew's Type I. The later and intermediate houses are more like Brew's Type II, and the latest house at Site 1, Cahone Canyon, Pit-house A, by seriation is of the type also shown to be the latest by stratigraphy (Martin, 1939, p. 346) and by its similarity to the kiva in form.

Although the trends in use and popularity of stone and bone artifact types were not clearly defined within the sites studied, the following observations can be made, based on the differences in the relative frequencies of types of tools recovered from the several sites as a whole (see table, page 100).

The following tools and artifact types were most frequently used during the Ackmen Focus (Late Abajo phase) and gradually decreased in use or disappeared from use thereafter:

- |                                       |                                       |
|---------------------------------------|---------------------------------------|
| 1. Diagonal-notched projectile points | 7. Spoon-spatula-type flesher         |
| 2. Diagonal-notched knives            | 8. Scoop-type fleshers                |
| 3. Chipped hoes                       | 9. Side-notched and poll-notched axes |
| 4. Metates, trough open one end only  | 10. Long rectangular pendants         |
| 5. Tabular-type manos                 | 11. Conical pipes                     |
| 6. Stubby and massive bone awls       |                                       |

The following tools and artifact types came into popular use during the Mancos phase and increased in popularity thereafter into the McElmo and Montezuma phases.

- |  |   |
|--|---|
| 1. Side-notched triangular projectile points | 6. Medium long awls                     |
| 2. Leaf-shaped blades                        | 7. Humerus-type flesher, condyle intact |
| 3. Thin, plate-like hoes                     | 8. Phalange-type flesher                |
| 4. Metate, trough open at both ends          | 9. Full-grooved ax                      |
| 5. Manos wedge-shaped in cross section       | 10. Oval pendants                       |
|  | 11. Elbow pipes                         |

As a result of this analysis certain trends in pottery types were also evident. These were either refinements of existing knowledge or discoveries of new characteristics of the trends.

(a) The popularity of Lino Gray waned as that of the corrugated types (Kana-a Gray, plain corrugated, and indented corrugated types) increased. The decline in the popularity of Lino Gray was most rapid after the indented corrugated types came into use early in the Mancos phase.

(b) The popularity of Lino Gray reached its peak shortly after Kana-a Gray came into use, in the early ninth century in the Ackmen-Lowry area.

(c) Kana-a Gray reached its peak of popularity during the latter half of the ninth century in this area (Ackmen Focus).

(d) Plain corrugated (unindented corrugated, usually confined to jar necks) reached its peak of popularity late in the Mancos phase, possibly as late as the middle of the eleventh century.

(e) Flat wavy indented corrugated reached its peak in the latter half of the tenth century in this area, about the middle of the Mancos phase. Medium, deep and square wavy corrugated types followed similar trends.

(f) During the McElmo phase there was greater uniformity in the corrugated wares and at the beginning of this phase the corrugated types exceeded the painted decorated types in popularity.

(g) Mancos Black-on-White reached its peak of popularity at the end of the Mancos phase (about A.D. 1100) and had an abrupt falling off in popularity during the McElmo phase.

(h) Abajo Red-on-Orange reached its peak early in the Abajo phase (about A.D. 700) and had a steady gradual decline in popularity thereafter until early in the Mancos phase, when it was no longer used.

(i) There is an unconformity between the end of the sequence of Cahone Canyon sites (Site 1, Pit-house A) and the earliest of the Ackmen-Lowry sites (the kiva of Site 1), which possibly indicates a gap at this point.

(j) In every case the percentages of pottery from the structures termed "kivas," "proto-kivas," and "great kivas" differ consistently from those of the so-called dwelling units, although they remain in harmony with the general trend. This difference may constitute evidence of a separate function for the "kiva" structures from that of the dwelling units. Although there is the same sort of architectural difference between the surface houses and the pit-houses of the Abajo phase, the difference in pottery percentages is not evident. This transition in pottery differences (function?) is associated with the first appearance of pilasters as roof supports in these kivas.

Another advantage of this method of seriation is that one can take a single house, a site, or a level and place it in its relative position in the sequence and in "time." This was done with pottery percentages from a trench dug through the refuse heap of a Pueblo II-III site located on the north rim of Cahone Canyon, which was excavated by A. K. Guthe for Ansel Hall. This site fitted in the Ackmen-Lowry sequence between Site 2, Ackmen-Lowry, and the Lowry ruin, and would possibly date in the late eleventh century.

This method of seriation also defines more clearly the details of stability and instability of the early Pueblo culture in the Ackmen-Lowry area during the various intervals of time represented in the sites investigated. Because we have a number of tree-ring dates at each end of the sequence to provide a rough time scale for comparison, we can deduce something concerning rates of change, such as the number of variations appearing in the material culture per unit of time, and the relative speed with which innovations were accepted or rejected. In our pottery graph this is represented by a percentage increase or decrease in the relative quantity of a particular type of pottery in a given unit of time.

The earliest period in our sequence, represented at Site 2, Cahone Canyon, and the earlier part of Site 1, lies in the eighth century and the beginning of the ninth, and according to the Gladwin classification falls in the Abajo phase. This was apparently a period of cultural stability. Pottery is assumed to be extremely sensitive to cultural change, and all the pottery types made during this period increase in popularity by very small increments between the "house-time" unit intervals;<sup>1</sup> for example, Lino Gray did not increase in popularity more than 5 per cent in the period between the occupancies of Pit-houses C and A, Site 2.

Other types such as Abajo Red-on-Orange decreased in popularity by even smaller amounts. There is also a marked uniformity of the surface architecture and relatively little difference between the architecture of the majority of the pit-houses during this period. The stone and bone tool types were also well established by this time. At Site 2 there is no trace of a basin metate, only one example of a chopper, and very few projectile points that could be considered atlatl points. It is evident that these "older" forms of tools were no longer used when Site 2 was occupied, and on the contrary the uniformity of metates, projectile points and the like at Site 2 shows

<sup>1</sup> As there are nine of these "house-time" units on a uniform curve between A.D. 736 and A.D. 855 (Pit-house G, Site 2, and Pit-house B, Site 1) each unit might represent a time span of about twelve years.



that these forms had probably become established some time before the earliest house at Site 2 was first occupied.

The next period represented at the latest part of Site 1, Cahone Canyon, and at Sites 1-4, Ackmen-Lowry (Martin, 1938), falls in the latter half of the ninth and most of the tenth century (Colton classification, Ackmen Focus; Gladwin classification, early Mancos phase). It was a period of instability, marked by lack of uniformity in pottery, in architecture, in bone and stone tools, in fact in everything that remains of this culture. Lino Gray pottery fell rapidly into disuse. Although there had been a decline of only about 6 per cent from the maximum during the century from A.D. 736 to A.D. 836, within approximately the next hundred years<sup>1</sup> this same type had declined 52 per cent in popularity, falling off as much as 20 per cent during a unit interval. All the "new" indented corrugated types appear to have come into use as a group at about the same time; at first they increased in popularity rather rapidly, but later in the period appear to have settled down to a fairly uniform acceptance. There were many varieties of indented corrugated pottery made at this time. In fact it is in the lack of homogeneity of the pottery types rather than in the rapidity of their acceptance or rejection, that we sense a lack of stability during this period. Moreover, this instability evidenced by heterogeneity is even more apparent in the architecture of the Mancos phase. On the four Ackmen-Lowry sites numerous varieties of architectural types were used practically simultaneously; for example, walls of slab and rubble, pole and brush, or of undressed sandstone block masonry construction may be found on the same sites.

The stone and bone tools also give evidence of this lack of uniformity. The metates are of two types—trough open at one end only or trough open at both ends. Notched axes are disappearing and grooved axes are more widely used.

At the end of our sequence, represented at the Lowry ruin (McElmo phase), the cycle is moving back once more into a period of stability. The architecture is uniform, as are the stone and bone tools, which do not show the variety of types apparent in the previous part of the cycle. Only one type each of ax, metate, and pipe is used during this period. During the McElmo phase the stability is evident in the pottery as well. At this time (the upper part of the Lowry sequence on the chart, Fig. 21), the pottery types

<sup>1</sup> A date of A.D. 936 is estimated for Site 4, Ackmen-Lowry (Martin, 1938) on the basis of interpolation between the Lowry ruin date and the dates for Site 1, Cahone Canyon.

increase or decrease in frequency by 2 per cent or 3 per cent and never more than 5 per cent. McElmo Black-on-White is the dominant decorated type, and Mancos Black-on-White declines to the vanishing point. Thus there is illustrated in the Lowry area a complete sequence from a period of stability through a time of instability and back once more to a stable period of a uniform, well-integrated culture.

#### SUMMARY

This type of seriation and its graphic method of presentation is a procedure that (1) contributes a method for the relative dating of the last occupation of structures, in the absence of absolute dates; (2) enables one to estimate and measure rates of change in culture as reflected in the material products of human activity, particularly in pottery; (3) indicates by irregularities in the trends where possible gaps in the data and sequences may lie; (4) provides a more detailed and precise trend than that delineated by a phase-to-phase or site-to-site comparison.

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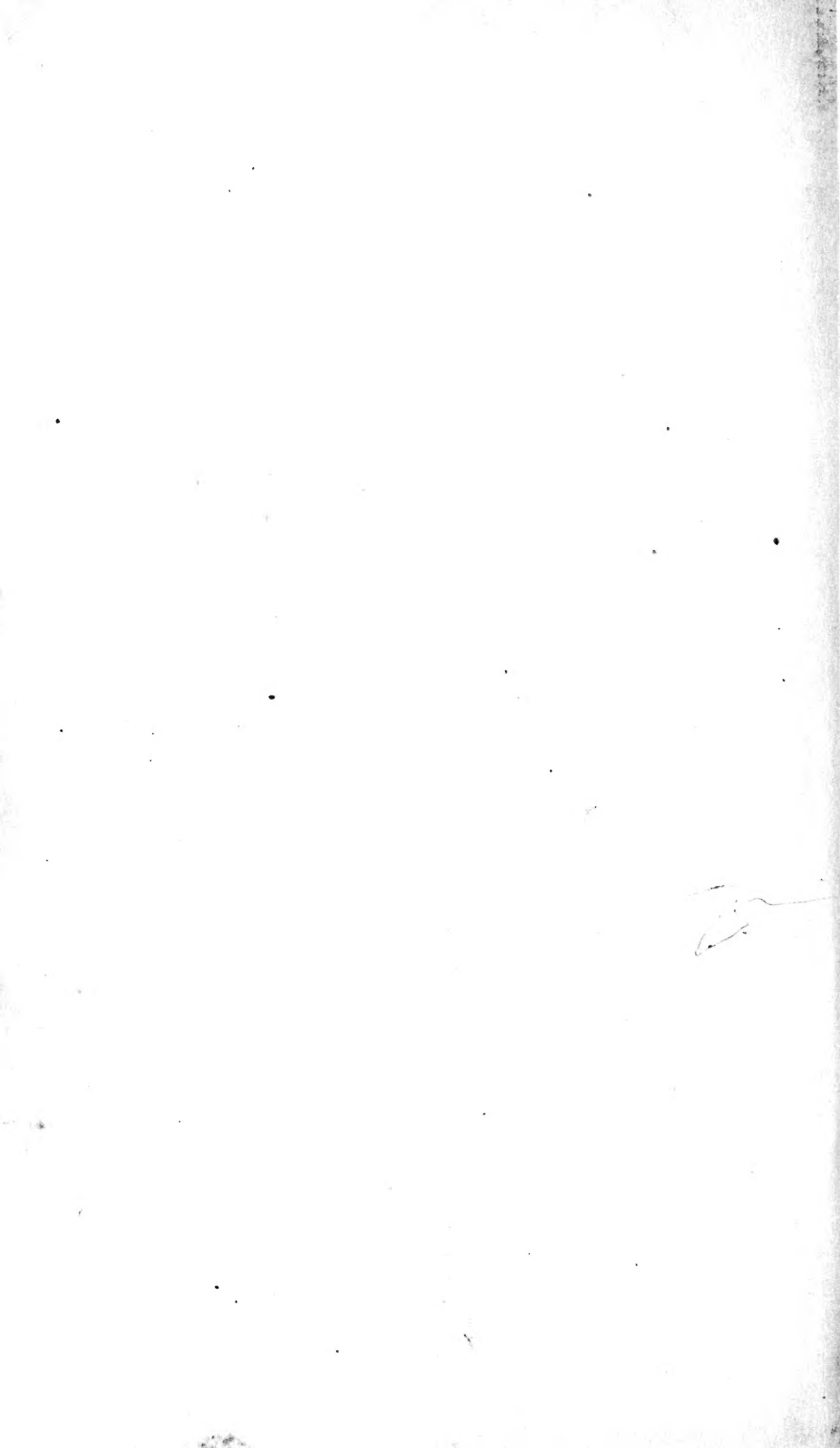
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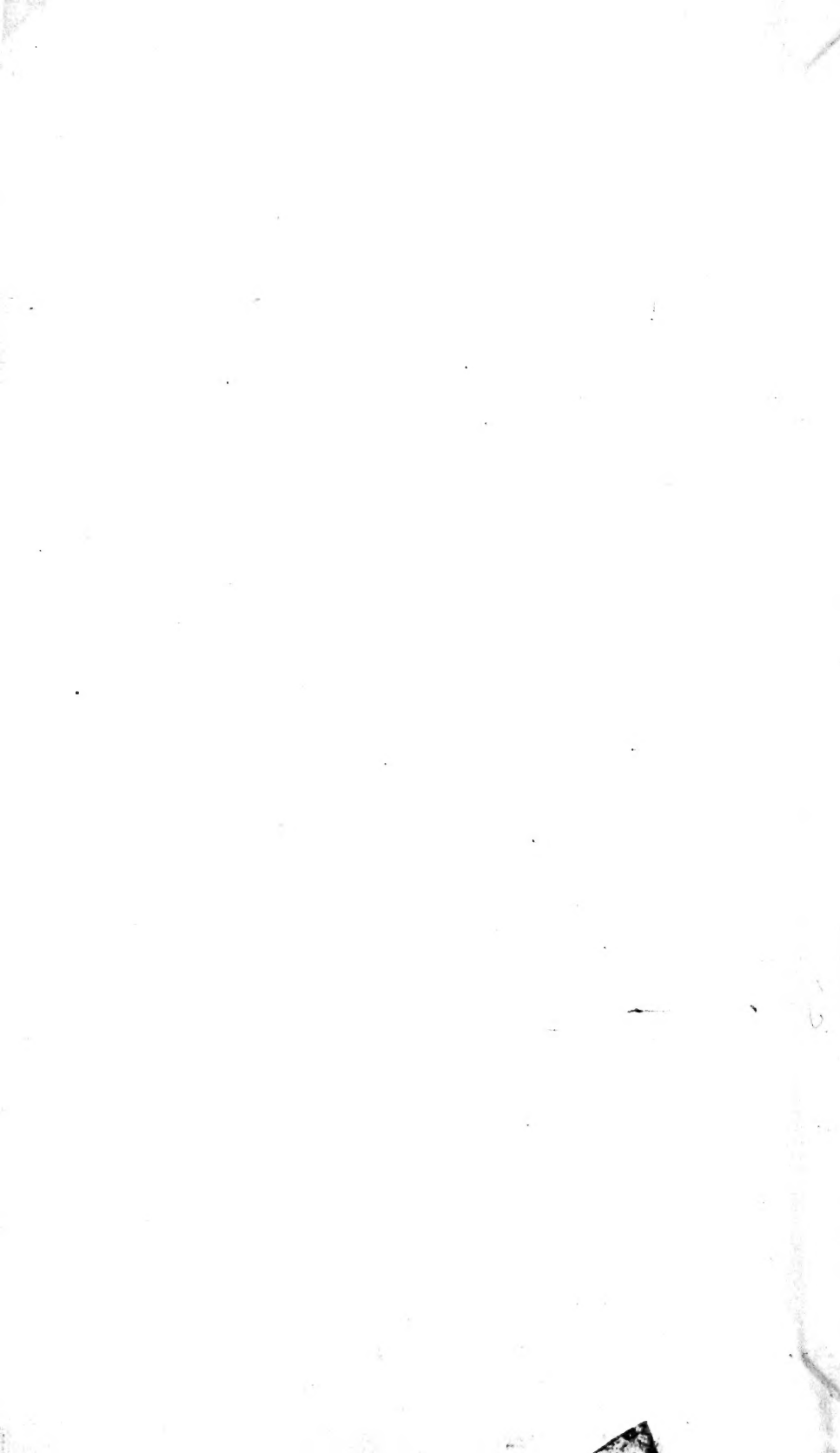
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